Record of Early Paleogene Hyperthermals in Sediments from Northern Zealandia: Understanding Carbonate Dilution in Shallow Marine Settings Vs. Carbonate Dissolution in Deep Marine Sites in Response to Extreme Warmth.

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ABSTRACT

Early Paleogene was the last phase of greenhouse conditions the Earth faced. Superimposed on long term warming during late Paleocene-early Eocene, several short lived extreme warming events occurred, called hyperthermals. Hyperthermals are characterized by light C injections into the exogenic C cycle and are recorded as negative C isotope excursions in the sedimentary record. The Paleocene Eocene Thermal Maximum ca. 55.9 Ma and other early Eocene hyperthermals have been studied in details in different deep marine sedimentary sections as well as in shallow marine depositional environments e.g. Mead and Dee Stream, New Zealand, Cicogna section in Italy etc. Hyperthermals are generally associated with pelagic carbonate dissolution in deep marine sites. However, expression of hyperthermals in marginal marine settings is complicated owing to extraneous factors like tectonics and eustasy and are often associated with marly carbonates or "diluted carbonates". Accelerated hydrologic cycle and increased continental weathering results in increased sediment supply to marginal marine environments resulting in such dilution. To test the ubiquity of this concept, here we generate carbon and oxygen isotope records from two locations of New Caledonia representing marginal marine depositional setting and two deep ocean sites of northern Zealandia to correlate them on a robust lithostratigraphic and chronostratigraphic framework. Successful working of the hypothesis will enable us establish that horizons of carbonate dilution in marginal marine settings during hyperthermals form correlative conformity with condensed horizons of carbonate dissolution in deep marine sites and such carbonate dilution events are not related to change of base level alone but also increase in sediment supply.

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